DOCUMENT RESUME

ED 152 055 EC 110 118

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TITLE Concept Development with Concrete Manipulative Materials and Games.
INSTITUTION North Dakota Univ., Grand Forks. Center for Teaching and Learning.
PUB DATE Mar 78
NOTE 15p.; Document may not reproduce well due to color of paper in the original
JOURNAL CIT Insights; v10 n6 p2-13 mar 1978

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Check Lists; *Concept Formation; *Developmental Disabilities; *Early Childhood Education; Games; *Instructional Materials; Learning Activities

ABSTRACT

The article introduces multi-purpose materials and suggestions for developing basic concepts with young children or the developmentally disabled. An informal checklist for beginning concepts is provided and instructions for using the geo-form board, form boxes for geometric shapes, race track forms and memory banks are included. (SBH)

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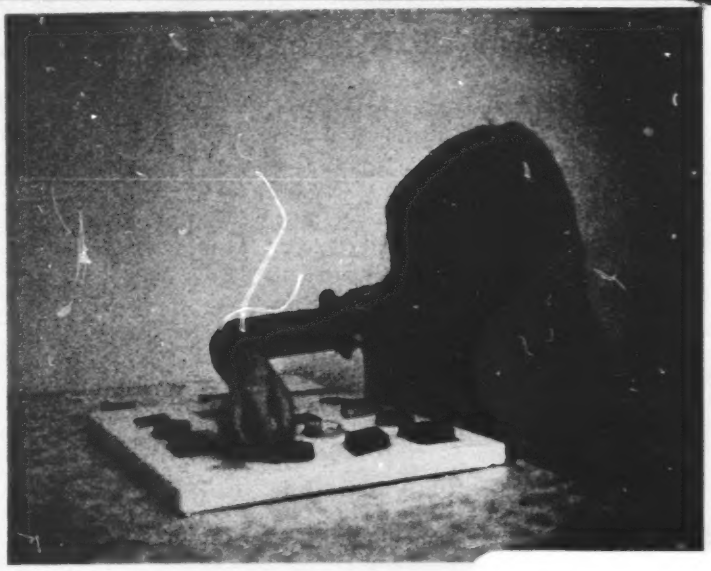

CENTER FOR TEACHING AND LEARNING
UNIVERSITY OF NORTH DAKOTA
GRAND FORKS 58201

Volume 10, Number 6
March 1978

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Concept Development With Concrete Manipulative Materials and Games

Introducing the Author

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INSIGHTS into open education

Concept Development With Concrete Manipulative Materials and Games

By Beverly Brekke

This article introduces multi-purpose materials and suggestions for developing basic concepts with young children or the developmentally disabled. These concepts can be learned with concrete manipulative materials which give meaning to the student's reasoning abilities. Rather than rote learning as counting, the student should have direct experiences to increase his/her logic. This is process oriented -- learning how to learn. The child develops logical thinking by organizing, classifying and generalizing. The child should verbalize what he/she sees and what he/she does with the concrete materials in the manipulative experiences.

Also included are some ways of making use of an informal checklist of beginning concepts. The checklist is intended as a flexible guide to help the teacher identify what concepts a child needs. The teacher may use the checklist to individualize instruction by assessing what the child knows and for planning instruction for unlearned concepts. The checklist may be extended with other skills and activities that may be suitable for the needs of each child. It also may be the basis for reporting to parents at conferences. Parts of the checklist may be utilized as appropriate for the diverse levels of different children in the classroom. The assessment is informal in terms of the child interacting with materials rather than measurement by paper and pencil. For instance, a child's concepts of color, shape and sequence may be evaluated by teacher observation of the child's involvement with the Geo-form Board. Suggestions for concept development through informal instruction with the Geo-form Board are provided for the teacher to adapt to the particular learning needs of the child. Other abilities as visual memory and drawing geometric forms may be strengthened through activities with the Form Boxes, Race Track Forms and Memory Banks. As the teacher works with a child, he/she records information on the checklist in the following way. On the line next to the concept a letter designation is used -- I - inappropriate, N - needs more help, K - knows concept. Under "COMMENTS" record the date and explicit information. For example, under 2. "SEQUENCES" the teacher may note next to "Color" N and under "COMMENTS" writes the date and notes: "Correctly orders only red and blue up to four blocks. Needs help combining yellow with red and blue."

Such explicit information not only extends the insights of a teacher, through systematic observation of the child's individual learning, but also enables the teacher to be aware of and plan for a child's specific needs, which can support developmental growth.

INFORMAL CHECK LIST FOR BEGINNING CONCEPTS

(Write letters on lines and record date and progress under Comments.)

1. RECOGNIZES: DATE/COMMENTS

Colors

red _____ green _____

yellow _____ purple _____

blue _____ black _____

orange _____ brown _____

Geometric Forms

circle _____ triangle _____

square _____ rectangle _____

diamond _____ others _____

Sizes

big _____ little _____

long _____ short _____

wide _____ narrow _____

2. SEQUENCES:

color _____

geometric form _____

combining color and shape _____

size of forms _____

other (weights, textures, sound) _____

3. DRAWS GEOMETRIC FORMS:

circle _____ divided rectangle _____

square _____ vertical diamond _____

triangle _____ horizontal diamond _____

rectangle _____

DATE/COMMENTS

4. DEMONSTRATES VISUAL MEMORY:

circle	_____	rectangle	_____
square	_____	diamond	_____
triangle	_____		

5. UNDERSTANDS POSITION IN SPACE:

up	_____	down	_____
top	_____	bottom	_____
high	_____	low	_____
above	_____	below	_____
in	_____	out	_____
inside	_____	outside	_____
on	_____	off	_____
under	_____	over	_____
in front of	_____	in back of	_____
beginning	_____	end	_____
before	_____	after	_____
near	_____	far	_____
right	_____	left	_____
center	_____		
middle	_____		
between	_____		

GEO-FORM BOARD

The Geo-Form Board is a manipulative device to help a student attain concepts related to color, shape and sequence.

Materials:

Wood or heavy cardboard; tracing paper; pencil; saw or knife; paint brush; red, yellow, green and blue acrylic paint.

Preparation:

1. Construct a Geo-form board from wood or heavy cardboard according to the patterns and matrix for shape and color by Len Marks.

2. Make two sets of sixteen geometric shape blocks as illustrated. Paint each set of sixteen blocks according to color key of diagram. (See p. 7)

Directions:

Matching Colors:

Position two red blocks and one yellow block of the same shape before the student. Put one of the red blocks in the hand of the child and say, "Find a red one like this." After the child has matched the two red blocks ask, "What color are these blocks?" Arrange the blocks as before and have the student match the red blocks again. Then add a green block to the red and yellow blocks and repeat matching the two red blocks. When the child succeeds in matching the red blocks several times, add a blue block to the other blocks and match the two red blocks once more. Have the child say the color "red" each time he/she matches the two red blocks. Next, show one row at a time on the Geo-form board; have the student place one matching red geometric shape block on the corresponding red shape in each row. Continue the same sequence for teaching yellow, green and blue colors. Adapt these suggestions to the learning needs of a student by adding or deleting intermediary steps in brief sessions.

Color Sequence:

Spread two each of red, yellow, green and blue blocks of the same shape in front of the child. Place a yellow block on a blue block and ask, "Can you make a stack like mine?" After the child does this, ask him/her to tell the colors. When the child can do this without difficulty, gradually increase the different color combinations in piles of two, three and four blocks. Have the student name the color order of each pile as the blocks are stacked. Select four colored blocks of matching shapes for the first row of the Geo-form

board. Then, have the child match the color sequence. Continue by showing one row at a time with the four corresponding blocks until the child has finished matching the color sequences.

Matching Shapes:

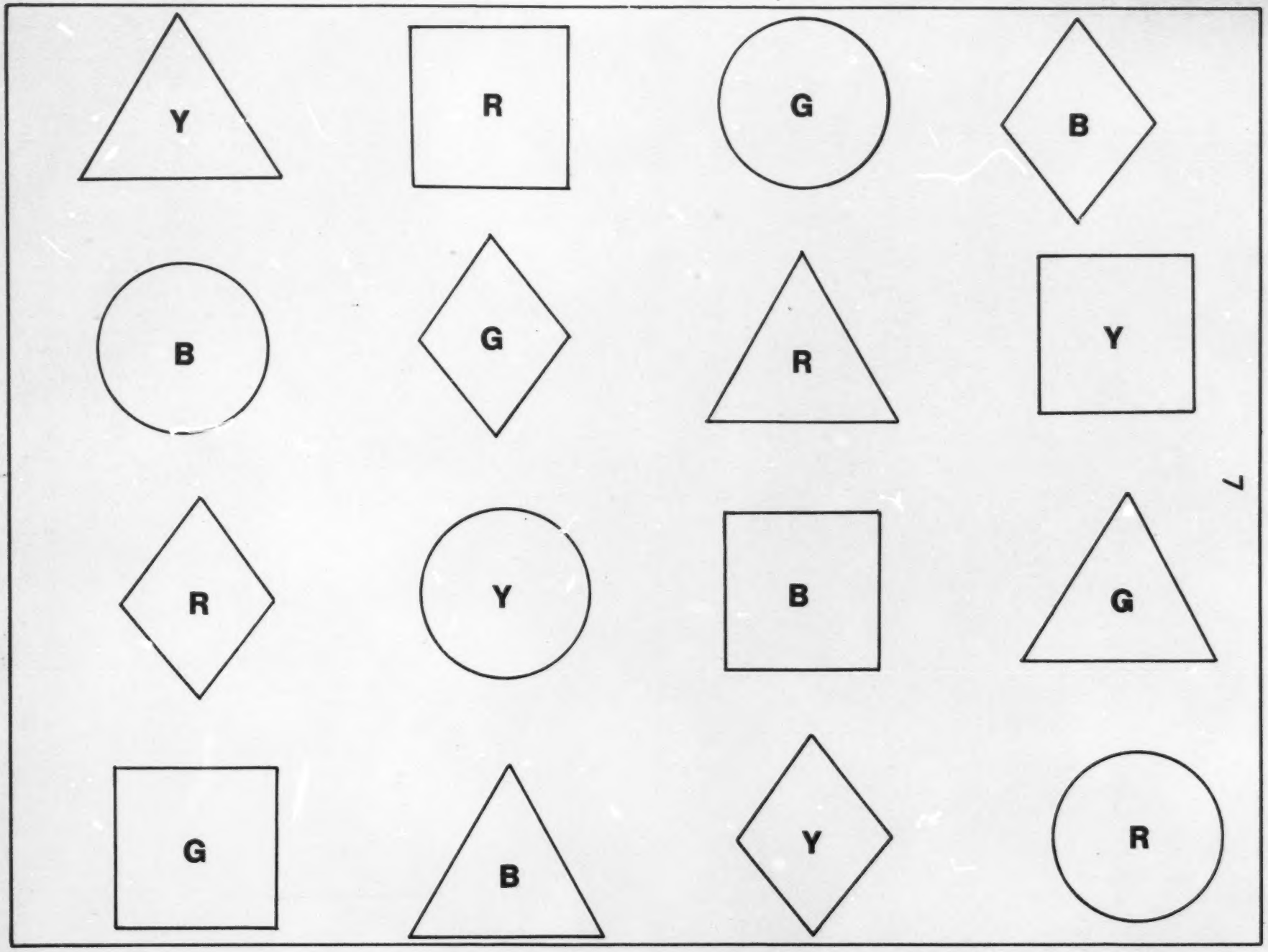
The shapes may be introduced in the order of circle, square, triangle and diamond. Place two circle shape blocks and a square shape block before the student. Put one of the circle blocks in the hand of the child and say, "Find a circle like this." Have the student trace the form of the circle by moving his/her fingers along the outside edge of both blocks. Ask, "How are these shapes the same?" If the child cannot verbalize, say, "The circles are round." Show several circle and square blocks and say, "Make a pile of all the circle shape blocks." Point to the circle pile and ask, "What are these shapes called?" Have the child place a circle block on each circle shape on the Geo-form board, working one row at a time (other rows covered) from left to right and from top to bottom. Then, replicate the procedural steps for the square, triangle and diamond shapes as needed.

Combining Color and Shape:

Place the red, yellow, green and blue circle blocks with the Geo-form board in front of the child with only the top row in view and say, "Show me the green circle block." Next, ask the child, "Can you find the green circle shape on the Geo-form board and put your green circle block on it?" Then question the student, "What is that block called?" Continue the series of steps for blue, yellow and red circle blocks, uncovering one row at a time for each color. Follow the sequence for the red, yellow, green and blue colored squares, triangles and diamonds. These steps may be introduced as the child is ready.

Visual Memory:

Turn the Geo-form to the reverse side. A black line may be drawn with a felt pen through the center of the board. The teacher places a paper barrier on the line to obscure the child's view. A sequence of two or three different colored geometric shapes is arranged on one side of the board by the teacher and then shown to the child for about ten seconds. The paper barrier is held in place while the child duplicates the pattern by memory. For example, as illustrated in the picture, the red diamond, green square and blue triangle would be arranged in order by the child on the other half of the board. Next, the barrier is removed, the child checks to see whether his/her sequence is the same as the pattern and the procedure is repeated until the model is correctly replicated. Gradually increase the difficulty of pattern sequence up to five or more as the child progresses.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FORM BOXES FOR GEOMETRIC SHAPES

Geometric forms can be traced with covers from shallow boxes.

Materials:

One shallow box, such as hosiery container, for each of the six shapes; a razor blade, knife or scissors for cutting the shapes in the box covers; pencil, compass and ruler for drawing geometric shapes or use outlines from the diagrams.

Preparation:

Cut geometric shapes in box lids (see illustrations for outlines of circle, square, rectangle and diamond).

Directions:

The student places a sheet of paper inside the box. Two-sided sticky tape may be used on the bottom of the box to keep the paper in position. Then the lid is placed on the box and the child may trace the geometric shape with a pencil, crayon, colored chalk or a felt marker.

Variation:

Cut shapes from ice cream bucket lids or coffee can lids.

RACE TRACK FORMS

Reinforce shape and size concepts through this kinesthetic and tactile perceptual activity of driving along geometric form tracks.

Materials:

Scrap wood or cardboard, yardstick, black felt marker, thumbtack, string and small toy car.

Preparation:

1. For a rectangular race track use a large rectangular shaped piece of scrap wood or cardboard.
2. With a felt marker and yardstick outline a continuous rectangle shaped piece of scrap wood or cardboard.

3. Tie one end of the string to the small toy car and secure the other end with a tack near the starting position of the race track line.

Directions:

The student places the car on the starting position and moves the car along the rectangle shaped tracks until the drive is completed at the center of the board. The car should be kept on the race track line, stressing precision driving rather than speed.

Variations:

1. Make the race tracks in the shapes of circles, squares, triangles and diamonds.

2. Use other themes as following a walking trail through a forest to find the camp ground. Several shapes may be combined to make an intricate trail.

MEMORY BANKS

Visual memory for geometric forms can be strengthened by using the memory banks.

Materials:

Five half gallon milk containers, contact paper, paper fasteners, sand paper, scissors, pencil, tracing paper, glue, cardboard, a black marking pen and paper.

Preparation:

1. For each milk container, cut three sides and bend back the

fourth side to form a door (see illustration).

2. Cover the box with contact paper.

3. Make a door knob by pressing a paper fastener through the door. Secure by folding back ends of the paper fastener on the under side of the door and cover with contact paper to hold firmly in place.

4. Cut geometric shapes from sandpaper and glue one shape on each piece of cardboard, made to fit inside the box. Outline the geometric sandpaper shape with a heavy black line. (See illustrations for outlines of circle, square, rectangle and diamond).

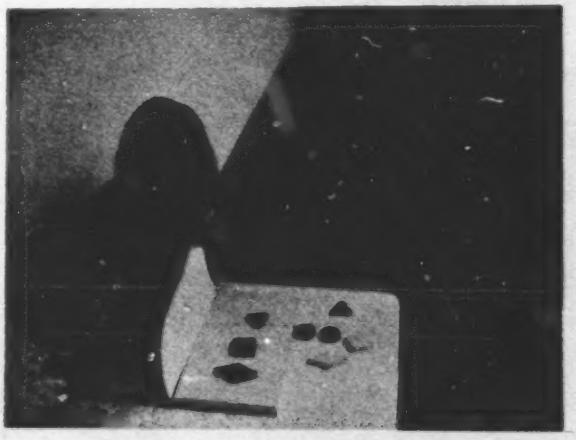
5. Place one geometric shape card inside each of the five containers prepared in steps one through three.

Directions:

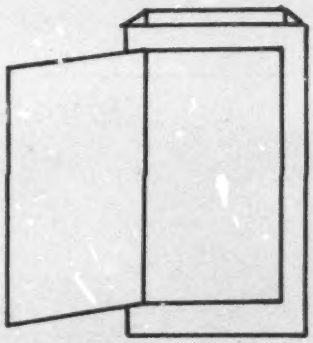
If the student knows the names of the geometric shapes he/she may begin this activity by opening the door of one memory bank at a time. He/she looks at the shape, feels the shape, names the shape, closes the door and draws the shape on a paper. Begin with the circle bank and add the square, rectangle, triangle and diamond banks as the student progresses. After the student has been successful in drawing the shapes, one at a time by recall, gradually increase the number of shapes to be reproduced until all five shapes are drawn from visual memory.

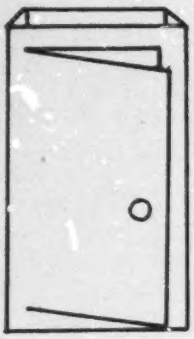
Variation:

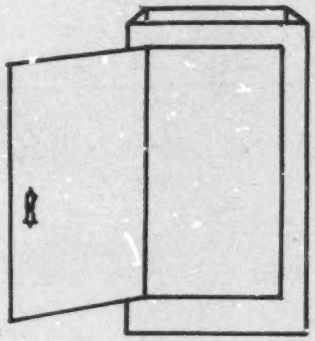
Sequence of geometric forms may be practiced by mixing the order of the banks and having the student recall by naming or drawing the shape.

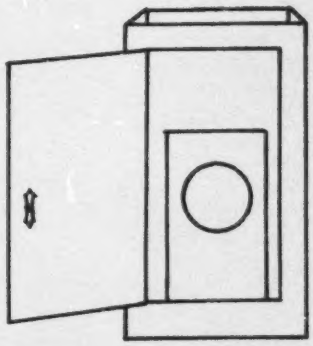


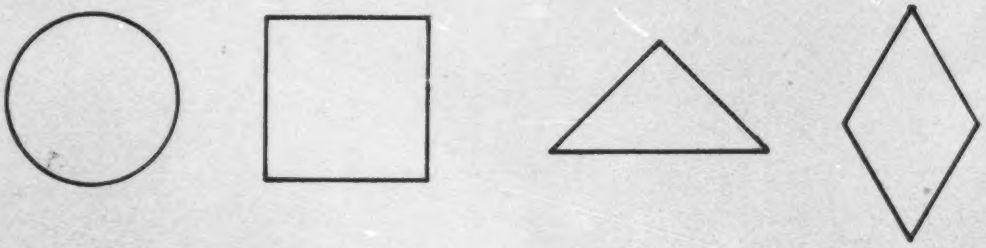
Geo-form Board Visual Memory











Introducing the Author

Beverly Brekke, a faculty member in the Center for Teaching and Learning, has been actively involved in both early childhood and special education. More than fifteen years of classroom teaching have stimulated her interest in how children learn concepts. This has been further extended through Piagetian studies for her doctoral work at the University of North Dakota and subsequent research publications related to the cognitive development of normal and exceptional children.

Her current projects include testing Piagetian object permanence concepts with severely retarded adults; measuring Piagetian formal operational thought in a developmental continuum with three hundred junior high, high school and university students; and comparing unschooled rural children with schooled semi-urban children on Piagetian conservation tasks as well as environmental factors in Senegal, West Africa. Despite this diverse range of interests, the common focus of Beverly's work reflects a continued concern for how individuals acquire concepts and developmentally learn.

INSIGHTS is published eight times during the academic year by the Center for Teaching and Learning, University of North Dakota.

Subscriptions are $3.50 per year payable by check or money order to INSIGHTS, Center for Teaching and Learning, Corwin Hall, University of North Dakota, Grand Forks, ND 58202. Editor - Clara A. Pederson.

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